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SOURCE Zoologicheskii Zhurnal, Vol XXVIII No 5, 1949.THE TICK HYALOMMA MARGINATUM MARGINATUM KOCH  
AS A TRANSMITTER OF RICKETTSIAS. P. Piontkovskaya  
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Several specimens of *Hyalomma marginatum* were collected from horned cattle in regions in the Crimea where hemorrhagic fever is prevalent, and other animals from the mountain-forest belts in Crimea). The ticks were fed on guinea pigs and the method of tick suspensions was utilized to obtain rickettsia strains. The result of this experiment proved that ticks were not only natural carriers but also acted as reservoirs for the virus throughout its metamorphic period, and the virus is ova-logenically transmitted. Studies were conducted to determine the presence of rickettsial virus in smears made from organs of the above-mentioned ticks.

Forty-five ticks (38 females, 7 males) were examined and rickettsial virus was identified in seven. The virus was stained according to Zdrodovskiy's method. Among the ticks which harbored the rickettsial virus were: 1) a female tick which had been kept without food for 1½ years at +4 degrees centigrade. It was a second generation laboratory specimen--descendant from an imago, and parasitic to the *Ovis tatarus* found in the steppe regions of Crimea (June 1946); 2) a second generation female laboratory specimen--descendant of a starved imago which was obtained from holes in animal skeletons in the same regions of the Crimea (June 1946). After 13½ months of starvation at +4 degrees centigrade, this female was fed for 5 days on mouse No 70. 3) A second generation female laboratory specimen--descendant of a nymph which is parasitic to the *Lepus europaeus* obtained from the mountain-forest regions of the Crimea. This female was starved for 11 months at +4 degrees centigrade, then fed for 3 days on mouse No 75. The remaining females were the third generation of laboratory specimens and descendants of imagos initially obtained from Crimean steppe rabbits.

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Polymorphic rickettsia with bipolar capsules was found in smears made from the salivary glands, stomach, malpighian vessels, and many other organs. Generally, these viruses are widely distributed, sometimes joined in couplets, in protoplasm, in protoplasmic vacuoles, and also freely in black granules contained in the stomach and light-refracting crystals obtained from malpighian vessel excreta.

In smears obtained from the organs of the first three females, rickettsia were observed rarely in nidi, but were identified in the nuclei where they were usually found in separate clusters. The viruses were plentiful in smears made from ovaries and particularly in blood-sucking females, due to the fact that simultaneously with an increase in the function of this organ during the blood-sucking period, there was a noticeable increase in the parasite count. Rickettsia is most frequently found in the nucleus as well as in the large spherical cells. Smears made from the salivary glands of females which did not suck blood, as well as smears from other organs, did not contain rickettsia.

A unique picture was presented by smears obtained from the ovaries of the four last mentioned females which were obtained from the Crimean steppes. One in particular was full of parasites; so much so that almost all the spaces between the nuclei were filled with polymorphous rickettsia. In many cases rickettsia was observed in the membrane of the nucleus. A similar degree of infection was observed in smears obtained from the ovaries of female *Rhipicephalus sanguineus* Latr. which were spontaneously infected by causative agents of *Marseilles* fever.

Rickettsial strains from ticks belonging to the same genus as the female were isolated and studied under a microscope. This proved that the *H.m. marginatum* was the carrier of the causative agents of spontaneous rickettsiosis and pathogenic to guinea pigs.

The presence of virus in smears made from organs of the alimentary tract, as well as the ovaries of females (starved for 11-18 months) of the second and third generations of laboratory specimens, revealed a high degree of adaptation of the ticks to the subject type of rickettsia. Discovery of the virus in ticks which were obtained from various regions proved the great distribution of spontaneously infected *H.m. marginatum* ticks by rickettsia in the Crimea.

#### Conclusions

1. Studies were made on smears (stained according to Zdrovskiy's method) obtained from the alimentary and genital organs of 38 female and seven male *H.m. marginatum* Koch ticks.
2. Smears from organs of three females of the second generation laboratory specimen, starved for 11 to 18 months at  $-4$  degrees centigrade, and four females of the third generation contained polymorphous rickettsia. These viruses were observed in the protoplasm and protoplasmic vacuoles. They were less frequently observed in nidi and nuclei. Smears from the ovaries of four females from the Crimean steppes contained large amount of parasites.
3. The fact that these females belong to the genus of ticks which carries spontaneous rickettsia pathogenic to guinea pigs permits the confirmation of these ticks as causative agents.
4. The presence of rickettsia in smears obtained from the organs of females of the second and third generation laboratory specimens with localization in the ovaries is not only a morphologic confirmation of its ovarigenic transmission but also confirms the high adaptation of the *H.m. marginatum* to the rickettsia parasite.

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